Claims

What is claimed is:

1. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 91, wherein the L-lysine at position 91 is altered to another amino acid, and one to three L-amino acids selected from the group consisting of valine at position 86, valine at position 87, histidine at position 88, threonine at position 95, threonine at position 98 and proline at position 99 are altered to an amino acid other than the amino acid present in the native protein at that position.

2. The peptide analogue of claim 1 wherein L-lysine at position 91 is altered to a non-conservative amino acid.

3. The peptide analogue of claim 1 wherein residue 91 is altered to D-lysine.

4. The peptide analogue of claim 1 wherein residue 91 is altered to an amino acid selected from the group consisting of arginine, asparagine, histidine, leucine, serine, glycine, glutamic acid, phenylalanine, alanine and D-lysine.

5. The peptide analogue of claim 1 wherein residue 91 is altered to alanine and residue 87 is altered to D-valine.

6. The peptide analogue of claim 1 wherein residue 91 is altered to alanine and residue 88 is altered to D-histidine.

8. The peptide analogue of claim 1 wherein residue 91 is altered to alanine, residue 87 is altered to D-valine, and residue 99 is altered to D-proline.

9. The peptide analogue of claim 1 wherein residue 91 is altered to alanine, residue 88 is altered to D-histidine, and residue 99 is altered to D-proline.

10. The peptide analogue of claim 1 wherein residue 88 is altered to an amino acid selected from the group consisting of serine, glutamic acid, tyrosine, leucine, D-histidine, glutamine, phenylalanine and lysine.

11. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 97, wherein the L-arginine at position 97 is altered to another amino acid and one to three L-amino acids selected from the group consisting of valine at position 86, valine at position 87, histidine at position 88, threonine at position 95, threonine at position 98 and proline at position 99 are altered to an amino acid other than the amino acid present in the native protein at that position.

12. The peptide analogue of claim 11 wherein the L-arginine at position 97 is altered to a non-conservative amino acid.

13. The peptide analogue of claim 11 wherein residue 97 is altered to D-arginine.

14. The peptide analogue of claim 11 wherein residue 97 is altered to an amino acid selected from the group of D-alanine, D-arginine, glycine, lysine, glutamine, glutamic acid, threonine, leucine, phenylalanine, histidine and alanine.

16. The peptide analogue of claim 11 wherein residue 97 is altered to alanine and residue 88 is altered to D-histidine.

17. The peptide analogue of claim 11 wherein residue 97 is altered to alanine and residue 99 is altered to D-proline.

18. The peptide analogue of claim 11 wherein residue 97 is altered to alanine, residue 87 is altered to D-valine, and residue 99 is altered to D-proline.

19. The peptide analogue of claim 11 wherein residue 97 is altered to alanine, residue 88 is altered to D-histidine and residue 99 is altered to D-proline.

20. The peptide analogue of claim 11 wherein residue 88 is altered to an amino acid selected from the group consisting of serine, glutamic acid, tyrosine, leucine, D-histidine, glutamine, phenylalanine and lysine.

21. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 95, wherein the L-threonine at position 95 is altered to another amino acid and one to three L-amino acids selected from the group consisting of valine at position 86, valine at position 87, histidine at position 88, threonine at position 98 and proline at position 99 are altered to an amino acid other than the amino acid present in the native protein at that position.

22. The peptide analogue of claim 21 wherein the L-threonine at position 95 is altered to a non-conservative amino acid.

24. The peptide analogue of claim 21 wherein residue 95 is altered to an amino acid selected from the group consisting of alanine, D-threonine, glycine, isoleucine, tyrosine, glutamine, serine, lysine, glutamic acid and histidine.

25. The peptide analogue of claim 21 wherein residue 95 is altered to alanine and residue 87 is altered to D-valine.

26. The peptide analogue of claim 21 wherein residue 95 is altered to alanine and residue 88 is altered to D-histidine.

27. The peptide analogue of claim 21 wherein residue 95 is altered to alanine and residue 99 is altered to D-proline.

28. The peptide analogue of claim 21 wherein residue 95 is altered to alanine, residue 87 is altered to D-valine, and residue 99 is altered to D-proline.

29. The peptide analogue of claim 21 wherein residue 95 is altered to alanine, residue 88 is altered to D-histidine, and residue 99 is altered to D-proline.

30. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 91, wherein the L-lysine at position 91 is altered to another amino acid and the N-terminal amino acid and the C-terminal amino acid are altered to another amino acid, such that upon administration of the peptide analogue *in vivo* proteolysis is reduced.

31. The peptide analogue of claim 30 wherein the N-terminal and C-terminal amino acids are D-amino acids.

33. The peptide analogue of claim 30 wherein residue 91 is altered to D-lysine.

34. The peptide analogue of claim 30 wherein residue 91 is altered to an amino acid selected from the group consisting of arginine, asparagine, histidine, leucine, serine, glycine, glutamic acid, phenylalanine, alanine and D-lysine.

35. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 95, wherein the L-lysine at position 91 is altered to another amino acid and the N-terminal amino acid and the C-terminal amino acid are altered to another amino acid, such that upon administration of the peptide analogue *in vivo* proteolysis is reduced.

36. The peptide analogue of claim 35 wherein the N-terminal and C-terminal amino acids are D-amino acids.

37. The peptide analogue of claim 35 wherein the L-threonine at position 95 is altered to a non-conservative amino acid.

38. The peptide analogue of claim 35 wherein residue 95 is altered to D-threonine.

39. The peptide analogue of claim 35 wherein residue 95 is altered to an amino acid selected from the group consisting of alanine, D-threonine, glycine, isoleucine, tyrosine, glutamine, serine, lysine, glutamic acid and histidine.

40. A peptide analogue comprising at least seven amino acids

upon administration of the peptide analogue *in vivo* proteolysis is reduced.

41. The peptide analogue of claim 40 wherein the N-terminal and C-terminal amino acids are D-amino acids.

42. The peptide analogue of claim 40 wherein the L-arginine at position 97 is altered to a non-conservative amino acid.

43 The peptide analogue of claim 40 wherein residue 97 is altered to D-arginine.

44. The peptide analogue of claim 40 wherein residue 97 is altered to an amino acid selected from the group of D-alanine, D-arginine, glycine, lysine, glutamine, glutamic acid, threonine, leucine, phenylalanine, histidine and alanine.

45. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 91, wherein the L-lysine at position 91 is altered to another amino acid.

46. The peptide analogue of claim 45 comprising seven to twelve amino acids.

47. The peptide analogue of claim 45, further comprising altering one to three additional residues selected from residues 86-90, 92-96, 98 and 99 to another amino acid.

48. The peptide analogue of claim 45 wherein L-lysine at position 91 is altered to a non-conservative amino acid

D-lysine.

50. The peptide analogue of claim 45 wherein residue 91 is altered to an amino acid selected from the group consisting of arginine, asparagine, histidine, leucine, serine, glycine, glutamic acid, phenylalanine, alanine and D-lysine.

51. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 95, wherein the L-threonine at position 95 is altered to another amino acid.

52. The peptide analogue of claim 45, further comprising altering one to three additional residues selected from residues 86-90, 92-94, and 96-99 to another amino acid.

53. The peptide analogue of claim 45, further comprising altering one to three additional residues selected from residues 86-94, 96, 98 and 99 to another amino acid.

54. A peptide analogue comprising at least seven amino acids selected from residues 86 to 99 of human myelin basic protein, including residue 97, wherein the L-arginine at position 97 is altered to another amino acid.

55. The peptide analogue of claim 45, further comprising altering one to three additional residues selected from residues 86-90, 92-96, 98 and 99 to another amino acid.

56. A pharmaceutical composition comprising a peptide analogue according to any one of claims 1, 11, 21, 30, 35, 40, 45, 51, and 54 in combination with a physiologically acceptable carrier or diluent.

57. A method of treating multiple sclerosis, comprising:

administering to a patient a therapeutically effective amount of a pharmaceutical composition comprising a peptide analogue according to any one of claims 1, 11, 21, 30, 35, 40, 45, 51, and 54 in combination with a physiologically acceptable carrier or diluent.

58. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 91 is alanine, residue 88 is D-histidine and residue 99 is D-proline.

59. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 91 is alanine, residue 87 is D-valine and residue 99 is D-proline.

60. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 91 is alanine and residue 88 is D-histidine.

61. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 91 is alanine and residue 87 is D-valine.

62. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 91 is alanine and residue 99 is D-proline.

63. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 95 is alanine, residue 87 is

64. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 95 is alanine, residue 88 is D-histidine and residue 99 is D-proline.

65. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 95 is alanine and residue 88 is D-histidine.

66. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 95 is alanine and residue 99 is D-proline.

67. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 95 is alanine and residue 87 is D-histidine.

68. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 97 is alanine, residue 87 is D-valine, and residue 99 is D-proline.

69. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 97 is alanine, residue 88 is D-histidine and residue 99 is D-proline.

70. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 97 is alanine and residue 87 is D-valine.

is D-histidine.

72. The method of claim 57 wherein the peptide analogue comprises 14 amino acids selected from residues 86 to 90 and residue 97 is alanine and residue 99 is D-proline.